

BULLETIN

OF THE INSTITUTE OF METALS

VOLUME 2

MAY 1955

PART 21

INSTITUTE NEWS

Autumn Meeting, Buxton, Derbyshire, Monday–Friday, 19–23 September 1955

As previously announced, the 1955 Autumn Meeting will be held in Buxton from Monday to Friday, 19–23 September 1955, by kind invitation of the Sheffield Local Section and industries of South Yorkshire.

A provisional programme is given below. Members will receive a separately printed programme and reply form in connection with the meeting in due course.

A most interesting and varied series of visits has been arranged in connection with this meeting, which the Council hopes will be well attended by members and their guests.

The "official hotel" for the meeting will be the Palace Hotel, Buxton.

PROVISIONAL PROGRAMME

Monday, 19 September

Location: Palace Hotel, Buxton.

All day. The Secretary's office will be open for the registration of members and guests.

Afternoon. Two simultaneous scientific sessions:

SESSION "A"

3.0 p.m. Theme: *Transformations in Copper Alloys*. A discussion, based on the following papers published in the *Journal*:

R. D. GARWOOD: "The Bainitic Transformation of the Beta Phase in Copper–Zinc Alloys" (Serial No. 1568; Oct. 1954).

R. HAYNES: "Isothermal Transformations of Hypo-Eutectoid Aluminium Bronzes" (Serial No. 1546; June 1954).

R. HAYNES: "Isothermal Transformations of Eutectoid Aluminium Bronzes" (Serial No. 1573; Nov. 1954).

R. HAYNES: "Some Observations on Isothermal Transformations of Eutectoid Aluminium Bronzes Below Their M_s Temperatures" (Serial No. 1604; March 1955).

SESSION "B"

3.0 p.m. (i) Theme: *Corrosion of Aluminium Alloys*. A discussion, based on the following papers published in the *Journal*:

N. P. INGLIS and E. C. LARKE: "Corrosion-Fatigue Properties of an Aluminium–Magnesium–Silicon Alloy in the Unprotected, Anodized and Painted Conditions" (Serial No. 1575; Dec. 1954).

F. A. CHAMPION: "The Interactions of Static Stress and Corrosion with Aluminium Alloys" (Serial No. 1609; April 1955).

4.0 p.m. (approx.) (ii) Theme: *Deformation and Creep of Aluminium Alloys*. A discussion, based on the following papers published, or to be published, in the *Journal*:

A. H. SULLY and H. K. HARDY: "Some Metallographic Observations of the Creep of Aluminium–Copper Alloys" (Serial No. 1521; Feb. 1954).

D. MCLEAN and M. H. FARMER: "Grain-Boundary Movement, Slip and Fragmentation During Creep of Aluminium–Copper, Aluminium–Magnesium, and Aluminium–Zinc Alloys" (Serial No. 1558; Sept. 1954).

G. R. WILMS: "Some Observations on the Creep of Pre-Strained Aluminium" (Serial No. 1616; May 1955).

K. M. CARLSEN and R. W. K. HONEYCOMBE: "Plastic Deformation of Aluminium–3.5% Copper Alloy Single Crystals" (Serial No. 1619; June 1955).

Location: Palace Hotel, Buxton.

Evening. Civic Reception, with Dancing, for members and their guests registered for the meeting, by invitation of the Mayor of Buxton.

Tuesday, 20 September

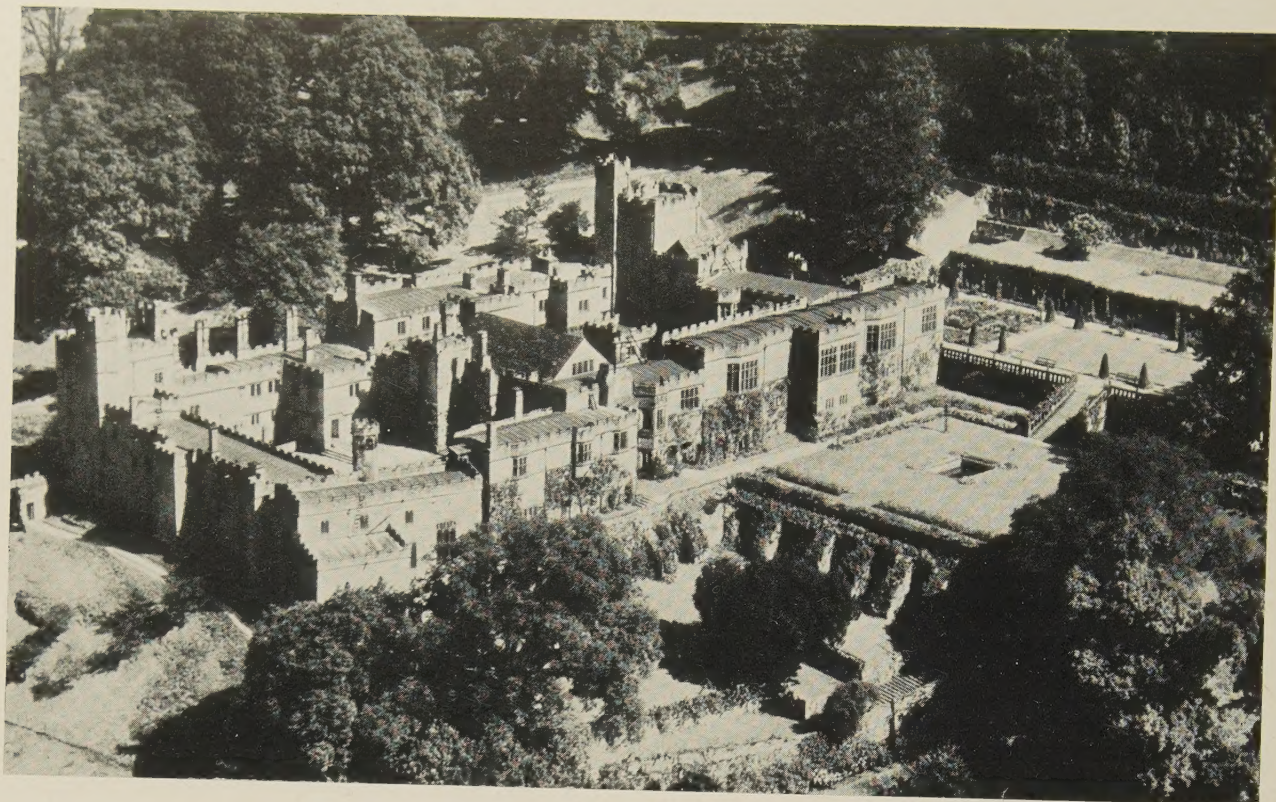
Location: Palace Hotel, Buxton.

All day. The Secretary's office will be open for the registration of members and guests.

Location: Firth Hall, The University of Sheffield.

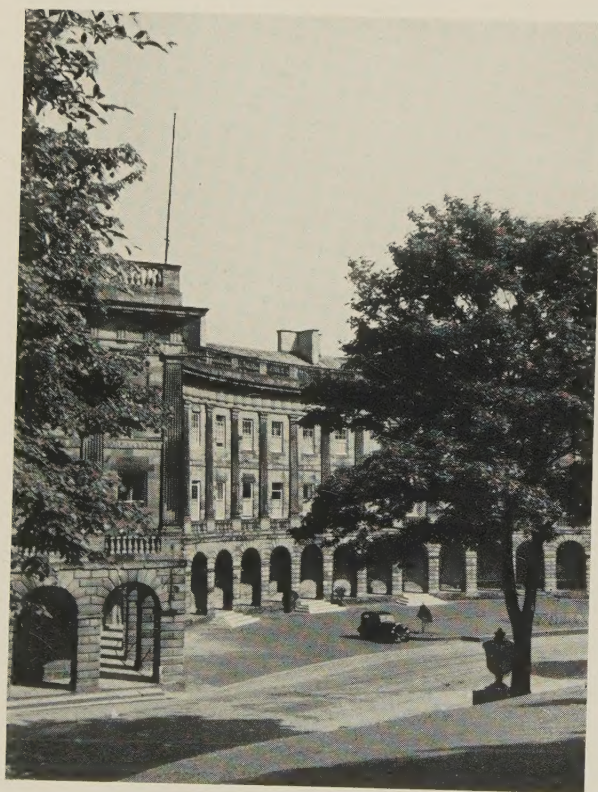
(Transport from Buxton to Sheffield will be provided by the Reception Committee.)

Morning. Twenty-Sixth Autumn Lecture, by Dr. C. SYKES, F.R.S.

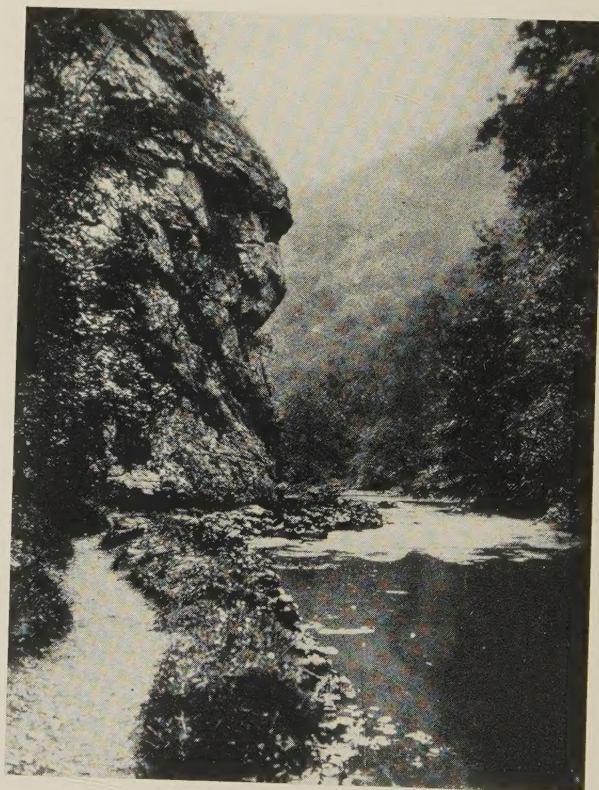


Haddon Hall.

[Courtesy Aero Pictorial, Ltd.]



The Crescent, Buxton.



Dovedale.

INSTITUTE NEWS

Tuesday, 20 September (cont.)

Location: Royal Victoria Hotel, Sheffield.

1.0 p.m. Luncheon, by invitation of the Reception Committee.

Afternoon. Visits, by invitation, for ticket-holders only, who have *registered* for the meeting. Transport kindly provided by the Reception Committee.

(a) *Members and Male Guests*

Edgar Allen and Co., Ltd., Imperial Steel Works, Sheffield 9.

British Iron and Steel Research Association, Research Laboratories, Hoyle Street, Sheffield.

Chesterfield Tube Co., Ltd., Derby Road, Chesterfield.

Davy and United Engineering Co., Ltd., Park Iron Works, Sheffield 4.

Firth-Brown Tools, Ltd., Speedicut Works, Carlisle Street East, Sheffield 4.

Millspaugh, Ltd., Alsing Road, Sheffield 9.

Walker and Hall, Ltd., Electro Works, Sheffield 1.

(b) *Ladies* (members may also take part, if desired)

Batchelors Peas, Ltd., Wadsley Bridge, Sheffield.

Haddon Hall (a seat of the Duke of Rutland).

Tea at Bakewell.

Walker and Hall, Ltd., Electro Works, Sheffield 1.

Evening. Free.

Wednesday, 21 September

All-day visits, by invitation, for ticket-holders only who have *registered* for the meeting, to works, laboratories, and other places of interest mainly located at a considerable distance from Buxton. Transport, kindly provided by the Reception Committee, will leave from the Palace Hotel, Buxton.

(a) *Members and Male Guests*

Thomas Bolton and Sons, Ltd., Froghall, Staffs. (Lunch by invitation.)

David Brown Companies, Ltd., Penistone, near Sheffield. (Lunch by invitation.)

English Steel Corporation, Ltd., River Don Works, Sheffield 9. (Lunch by invitation.)

Thomas Firth and John Brown, Ltd., Atlas Works, Sheffield 4, and Firth-Vickers, Ltd. (continuous strip mill), Sheepcote Lane, Sheffield. (Lunch by invitation.)

Hadfields, Ltd., East Hecla Works, Sheffield 9. (Lunch by invitation.)

Steel, Peech and Tozer, Templeborough Works, and the Swinden Laboratories of the United Steel Companies, Ltd., Moorgate, Rotherham. (Lunch by invitation.)

(b) *Ladies* (members may also take part, if desired)

Royal Crown Derby Porcelain Co., Ltd., Derby. Lunch at Derby. Afternoon visit to Chatsworth House (home of the Dukes of Devonshire) and Gardens. Tea at Baslow.

Evening. Free.

Thursday, 22 September

Location: Palace Hotel, Buxton.

Morning. Two simultaneous scientific sessions:

SESSION "A"

Theme: Working Properties of Metals. A discussion, based on the following papers published in the *Journal*:

J. F. ALDER and V. A. PHILLIPS: "The Effect of Strain Rate and Temperature on the Resistance of Aluminium, Copper, and Steel to Compression" (Serial No. 1570; Nov. 1954).

E. A. LEECH, P. GREGORY, and R. EBORALL: "A Hot Impact Tensile Test and its Relation to Hot-Working Properties" (Serial No. 1602; March 1955).

B. B. HUNDY and A. R. E. SINGER: "Inhomogeneous Deformation in Rolling and Wire-Drawing" (Serial No. 1612; May 1955).

SESSION "B"

Discussion on "Radiation Damage to Metals and Associated Problems," arranged by the Metal Physics Committee.

Afternoon. Visits by invitation, for ticket-holders only who have *registered* for the meeting. Transport, kindly provided by the Reception Committee, will leave from the Palace Hotel, Buxton.

(a) *Members and Male Guests*

Brightside Foundry and Engineering Co., Ltd., Engineering Division, Sheffield 1.

Derbyshire Silica Firebrick Co., Ltd., Friden, Hartington, near Buxton.

H. J. Enthoven and Sons, Ltd., Darley Dale Smelter, South Darley, Matlock.

Mappin and Webb, Ltd., The Royal Works, Queen's Road, Sheffield 2.

Oakes, Turner and Co., Ltd., 79 Eyre Street, Sheffield 1 (representatives of competitors cannot be received).

Sheepbridge Alloy Castings, Ltd., Sutton-in-Ashfield, Notts.

Solus-Schall, Ltd., The Old Mill, Matlock Green, Matlock (Laboratory for non-destructive testing).

Stephenson, Blake and Co., Ltd., Caslon Letter Foundry, Sheffield 3.

(b) *Ladies* (members may also take part, if desired)

Hardwick Hall, Derbyshire (house of the Dowager Duchess of Devonshire) and Gardens. Tea will be arranged.

Location: Palace Hotel, Buxton.

Evening. *Banquet* for members and their guests who have *registered* for the meeting, by invitation of the Reception Committee.

Friday, 23 September

All day. Coach tour of Derbyshire.

ACCOMMODATION IN BUXTON

Members and their guests are requested to make their own arrangements regarding accommodation, either at Buxton or at the University Halls of Residence at Sheffield (see below), as early as possible.

The Institute's Headquarters Hotel, at which the social functions and scientific sessions will be held, will be:

***** THE PALACE HOTEL, Buxton (Tel.: Buxton 2000).
Rooms for about 200 persons have been reserved.
This hotel has a swimming-bath and squash court.

Other hotels at which accommodation is available at Buxton are as follows (the Automobile Association grading is given against each):

*** ST. ANN'S HOTEL, Buxton (Tel.: Buxton 1788).
*** OLD HALL, Buxton (Tel.: Buxton 475).
** GROVE HOTEL, Grove Parade, Buxton (Tel.: Buxton 7).
** SAVOY HOTEL, Buxton (Tel.: Buxton 497).
** BUCKINGHAM HOTEL, Buxton (*unlicensed*). (Tel.: Buxton 439).
SPA HOTEL, Buxton (same management as the Palace Hotel). (Tel.: Buxton 1261).

A boarding house, with very limited but inexpensive accommodation (suitable for students) is:

THORNCLIFFE, Hartington Road, Buxton (Mrs. Mycock). (Tel.: Buxton 2041).

A limited amount of accommodation for single and married members will be available in the University Halls of Residence at Sheffield during the Autumn Meeting at Buxton. The facilities are as good as at many second-class hotels. The charge for bed and breakfast is 16s. per day for the first three days and 12s. per day thereafter. It is desirable that early application should be made, preferably before June 30, if reservations are required. Late applications may be received up to August 31, but a reservation cannot then be guaranteed.

Transport will be provided, free of charge, between Sheffield and Buxton for those registered as attending the Autumn Meeting.

Committees for 1955-56

The following Chairmen of Committees have been appointed by the Council for 1955-56:

Finance and General Purposes Committee: Mr. E. H. JONES, A.R.I.C., M.I.M.M., F.I.M.

Local Sections Committee: Dr. L. B. PFEIL, O.B.E., A.R.S.M., F.R.S., F.I.M.

Metal Physics Committee: Professor G. V. RAYNOR, D.Sc., D.Phil., M.A., F.R.I.C., F.Inst.P., A.I.M.

Metallurgical Engineering Committee: Mr. W. J. THOMAS, M.I.Mech.E., M.I.E.E.

"Metallurgical Reviews" Executive Committee: Dr. IVOR JENKINS, F.I.M.

Publication Committee: Major P. LITHERLAND TEED, A.R.S.M., F.R.Ae.S., M.I.M.M., F.I.M.

Students' Essay Prize Competition, 1954

The Adjudicators have awarded a first and a second prize in connection with the 1954 Students' Essay Competition, as follows:

First prize of twenty-five guineas to Dr. A. P. Miodownik, B.Sc., L.I.M. (Student Member), Research Investigator, Battersea Polytechnic, London, S.W.11, for an essay on "The Significance of Microhardness Testing". On the recommendation of the Adjudicators, the essay will be published in the *Bulletin*.

Second prize of fifteen guineas to Mr. SURINDAR SINGH (Student Member), Student, Wednesbury Technical College, for an essay on "The Kirkendall Effect".

Monograph No. 16: The Control of Quality in the Production of Wrought Non-Ferrous Metals and Alloys. II.—The Control of Quality in Working Operations

This, the latest addition to the Monograph Series, contains the papers presented at the Spring Meeting last year, together with the discussion on them. Copies are now available at the following rates (post free):

Members (one copy only at)	7s. 6d. or \$1.50
Non-members	15s. 0d. or \$2.50
Libraries	12s. 6d. or \$1.95

Annotated Equilibrium Diagram: Iron-Nickel System

This Annotated Equilibrium Diagram (No. 11 in the series) has now been published. It has been prepared by Mr. R. W. Floyd of The Mond Nickel Co., Ltd. Copies may be obtained at the following prices (post free):

Members (one copy only at)	1s. 0d. or \$0.40
Non-members	2s. 0d. or \$0.50
Libraries	1s. 8d. or \$0.40

The Publication Committee has recently commissioned twelve further Annotated Equilibrium Diagrams. These will be announced in the *Bulletin* when ready.

Engineering, Marine, and Welding Exhibition and the Foundry Trades Exhibition

The Council has accepted an invitation for Members of the Institute to pay an official visit to this Exhibition at Olympia, London, W.14, on Thursday, 8 September 1955. Tickets of admission will be distributed to members in due course.

Informal Discussion on "The Treatment of Swarfs, Sawings, and Residues, in the Non-Ferrous Metal Industries"

A full transcript of this discussion, held in Birmingham on 16 February under the auspices of the Metallurgical Engineering Committee, is available for consultation at the Institute's offices. As there is only one copy, however, it cannot be sent on loan to members.

It is intended to publish a summary of the discussion in a later issue of the *Bulletin*.

Reduced Rate of Subscription for Members Retired from Active Professional Life

Members who have retired from their main professional occupation, are not less than 65 years of age, and have been members of the Institute for not less than 25 years, may claim the privilege of paying a reduced rate of subscription on application to the Secretary.

Election of Members

The following 9 Ordinary Members, 3 Junior Members, and 6 Student Members were elected on 16 March 1955:

As Ordinary Members

- ALLEAUME, J. H., Ingénieur du Génie Maritime, Etablissement National de la Marine à Indret, Loire-Inférieure, France.
- BAKER, James Lawrence, S.B., Chief Metallurgist, Seymour Manufacturing Company, Seymour, Conn., U.S.A.
- BOCK, W. Kenneth, Ph.D., Manager, Metallurgical Research, National Malleable and Steel Castings Company, 10600 Quincy Avenue, Cleveland 6, Ohio, U.S.A.
- HAUPT, Richard Harvey, B.S.Met., Metallurgist, Federated Metals Division, American Smelting and Refining Company, 2230 Indianapolis Boulevard, Whiting, Ind., U.S.A.
- LARGE, Michael John, Metallurgist and Chief Chemist, Carr Fastener Co., Ltd., Stapleford, Nottingham.
- MORGAN, Colin Charles, Representative/Buyer, Raw Materials Division, George Cohen Sons and Co., Ltd., Beaufort Works, Morriston, Swansea, Glam.
- PLUMMER, Harry, Experimental Officer, Material Research and Development Branch, Ministry of Supply, 1-13 St. Giles High Street, London, W.C.2.
- PREISIG, Jakob, Direktor, Aluminium Laufen A.G., Laufen, Berner Jura, Switzerland.
- STEARNS, William L., B.S., M.E., Development Engineer, Bridgeport Brass Company, Adrian Division, Adrian, Mich., U.S.A.

As Junior Members

- FOX, Michael Robert, Metallurgical Assistant, Turner Manufacturing Co., Ltd., Wulfruna Works, Villiers Street, Wolverhampton.
- HOLDEN, Alan, Metallurgist, The Stourbridge Rolling Mills, Ltd., Stourbridge, Worcestershire.
- WILKES, John Walter Derek, B.Sc., Metallurgist, Process Development Department, Henry Wiggin and Co., Ltd., Wiggin Street, Birmingham 16.

As Student Members

- ABRAHAM, Marvin Sidney, B.S., Student, Columbia University, School of Mines, New York 27, N.Y., U.S.A.
- BRANDON, David Godfrey, Undergraduate, Department of Metallurgy, University of Cambridge.
- COTTON, William David Vivian, Undergraduate, Department of Metallurgy, University College, Swansea.
- DAVIES, Peter Wesley, Undergraduate, Department of Metallurgy, University College, Swansea.
- DEWSNAP, Ronald Francis, A.Met., Department of Metallurgy, University of Sheffield.
- EVANS, John Ronald, Undergraduate, Department of Metallurgy, University College, Swansea.

The following 15 Ordinary Members, 1 Junior Member, and 5 Student Members were elected on 30 March 1955:

As Ordinary Members

- BAYLISS, Rex Norman, Senior Assistant to Chief Metallurgist, Walter Somers, Ltd., Halesowen, near Birmingham.
- BUNGARDT, Professor Walter, Dr.-Ing., Leiter des Metall-Laboratorium, Th. Goldschmidt A.G., Heilermannstrasse 15, Essen, Germany.
- CAVANAGH, Patrick Edgar, B.A.Sc., Director, Department of Metallurgy, Ontario Research Foundation, 43 Queen's Park, Toronto 5, Ont., Canada.
- DARELIUS, Charles Ferdinand, B.S., Development Engineer, Kennecott Wire and Cable Co., Phillipsdale (Rumford 16), R.I., U.S.A.
- DARGUE, Ralph Hunter, Technical Assistant, Laboratories, D. Napier and Son, Ltd., 211 The Vale, London, W.3.
- DAVIES, Evan Ronald, B.Sc., Assistant Metallurgist, Aluminium Wire and Cable Co., Ltd., Port Tennant, Swansea.
- EDWARDS, Arnold John, B.A., B.Sc., A.R.I.C., Manager, Research Laboratory, Imperial Smelting Corporation, Ltd., Avonmouth.
- EPRON, Pierre, Directeur Général, S.A. Lorraine-Escaut, 103 rue la Boétie, Paris 8e, France.
- HOOD, Thomas Wilson, M.A., A.M.I.E.E., Engineer, W. H. A. Robertson and Co., Ltd., Lynton Works, Bedford.
- LATTY, Instructor-Lieutenant Clive Way, B.Sc., R.N., Royal Naval Air Station, Bramcote, Nuneaton, Warwickshire.
- LILLIE, Charles Robert, M.S., Research Metallurgist, Non-Ferrous Metallurgy Section, Metals Research Department, Armour Research Foundation, 10 West Thirty-Fifth Street, Chicago 16, Ill., U.S.A.
- POST, Carl B., B.S., Ph.D., Chief Metallurgist and Director of Research, The Carpenter Steel Company, P.O. Box 662, Reading, Pa., U.S.A.
- SCHAEFER, Adolph Oscar, B.S., Vice-President, The Midvale Company, Nicetown, Philadelphia 40, Pa., U.S.A.
- WALMSLEY, Robert G., Technical Sales Manager, Bearing and Sintered Metal Departments, Small and Parkes, Ltd., Hendham Vale Works, Manchester 9.
- ZEIGLER, Paul P., Director of Metallurgical Research, Kaiser Aluminum and Chemical Corporation, Kaiser Building, 1924 Broadway, Oakland 12, Calif., U.S.A.

As Junior Member

- BROWN, Clive Albert, Metallurgist, The British Thermostat Co., Ltd., Windmill Road, Sunbury-on-Thames, Middlesex.

As Student Members

- ABOWITZ, Gerald, B.Met.E., Campbell Fellow, School of Mines, Columbia University, New York 27, N.Y., U.S.A.
- BLANCHARD, Bryan Edwin, Laboratory Assistant, Nelson Research Laboratories, The English Electric Co., Ltd., Stafford.
- KIRK, William F., B.Met.E., Research Assistant, Metallurgy Department, New York University, New York 53, N.Y., U.S.A.
- MACHIN, John Donald Ray, Student, 36 Violet Hill Road, Stowmarket, Suffolk.
- STREET, Derek Malcolm, B.Eng., Research Student, Department of Metallurgy, University of Liverpool.

COUNCIL 1955-56

President :

Cook, Maurice, D.Sc., Ph.D., F.I.M.; Joint Managing Director, Imperial Chemical Industries Ltd., Metals Division.

Past-Presidents :

Dorey, S. F., C.B.E., D.Sc., F.R.S., M.I.Mech.E., M.I.C.E.; Chief Engineer Surveyor, Lloyd's Register of Shipping, London.

Smithells, C. J., M.C., D.Sc., F.I.M.; Director of Research, The British Aluminium Co., Ltd., Gerrards Cross, Bucks.

Thompson, Professor F. C., D.Met., M.Sc., F.I.M.; Professor of Metallurgy, University of Manchester.

Vice-Presidents :

Ball, Major C. J. P., D.S.O., M.C., F.R.Ae.S.; Member of the Management Committee of The Distillers Co., Ltd.; Chairman and Managing Director, Magnesium Elektron, Ltd.; Managing Director, F. A. Hughes and Co., Ltd.; Director, Sterling Metals, Ltd. (*Senior Vice-President.*)

Jones, E. H., A.R.I.C., M.I.M.M., F.I.M.; Joint Managing Director, Capper Pass and Son, Ltd., Bristol.

Pfeil, L. B., O.B.E., D.Sc., A.R.S.M., F.R.S., F.I.M.; Director, The Mond Nickel Co., Ltd.; Director, Henry Wiggin and Co., Ltd.

Raynor, Professor G. V., D.Sc., D.Phil., M.A., F.R.I.C., F.Inst.P., A.I.M.; Professor of Physical Metallurgy, University of Birmingham.

Teed, Major P. Litherland, A.R.S.M., F.R.Ae.S., F.I.M., M.I.M.M.; Assistant Chief of Aeronautical Research and Development, Vickers-Armstrongs, Ltd. (Aircraft Section), Weybridge, Surrey.

Thomas, W. J., M.I.Mech.E., M.I.E.E.; Joint Managing Director, The British Aluminium Co., Ltd.; Director, North British Aluminium Co., Ltd.; Director, Lochaber Power Co.; Director, Imperial Magnesium Corporation, Ltd.; Chairman, William Mills, Ltd.; Director, Alumina Co., Ltd.; Director, Gold Coast Bauxite Co., Ltd.; Director, Aluminium Corporation, Ltd.; Director, British and Colonial Bauxite Co., Ltd.; Director, Alliance Aluminium Holdings, Ltd.; Director, Aluminium Wire and Cable Co., Ltd.; Director, Magnesium Elektron, Ltd.

Honorary Treasurer :

Colquhoun, J. C., M.B.E., Chairman and Managing Director, The Manganese Bronze and Brass Co., Ltd., Ipswich and Birkenhead; Chairman, Lightalloys Ltd., London.

Ordinary Members of Council :

Baer, Alfred M., B.A.; Vice-Chairman, The Consolidated Zinc Corporation, Ltd.; Chairman, H. J. Enthoven and Sons, Ltd.; Director, Imperial Smelting Corporation, Ltd.; Director, The Zinc Corporation, Ltd.; Director, New Broken Hill Consolidated, Ltd.; Director, British Titan Products Co., Ltd.; Director, National Alloys, Ltd.

Baker, W. A., D.Sc., F.I.M.; Research Manager, British Non-Ferrous Metals Research Association, London.

Benson, L. E., M.Sc., F.I.M., Metallurgist, Metropolitan-Vickers Electrical Co., Ltd., Manchester.

Bond-Williams, N. I., B.Sc., A.I.M.; Chairman and Managing Director, The Aston Chain and Hook Co., Ltd., Birmingham; Director, Midland Laboratory Guild (1928), Ltd.

Francis-Carter, C. F. J., O.B.E., F.R.I.C., M.I.Chem.E., F.I.M., Managing Director, Aluminium Wire and Cable Co., Ltd., Swansea.

Gadd, E. R., F.I.M.; Chief Metallurgist, The Bristol Aeroplane Co., Ltd., Engine Division, Filton, Bristol.

Grimston, The Hon. John, M.P.; Director and General Manager, Enfield Rolling Mills, Ltd., Brimsdown, Enfield; Director, Enfield Copper Refining Co., Ltd.; Director, Enfield Rolling Mills (Aluminium), Ltd.; Director, Enfield Zinc Products, Ltd.; Director, London Zinc Mills, Ltd.; Director, Holloway Metal Roofs, Ltd.

Hamer, R. D., B.Sc., F.I.M.; Vice-President and Director, Aluminium Laboratories Ltd.; Director, Magnesium Company of Canada, Ltd.

Inglis, N. P., Ph.D., M.Eng., M.I.Mech.E., F.I.M.; Research Director, Imperial Chemical Industries, Ltd., Metals Division, Birmingham.

Jenkins, Ivor, D.Sc., F.I.M.; Chief Metallurgist, Research Laboratories of The General Electric Co., Ltd., Wembley, Middlesex.

Neave, D. P. G., M.A., M.I.Mech.E., Vice-Chairman and Joint Managing Director, Consolidated Zinc Corporation, Ltd.; Director, British Titan Products Co., Ltd.; Director, Broken Hill Corporation, Ltd.; Director, Capper Pass and Son, Ltd.; Director, Fisons, Ltd.; Director, Imperial Smelting Corporation, Ltd.; Director, Mufulira Copper Mines, Ltd. (London Advisory Committee); Director, New Broken Hill Consolidated Co., Ltd.; Director, Wolverhampton Metal Co., Ltd.; Director, Zinc Corporation, Ltd.

O'Neill, Professor H., M.Met., D.Sc., F.I.M., Professor of Metallurgy, University College, Swansea.

Ramsay, A. G., Ph.D., B.Sc., A.R.I.C.; Director, The Mond Nickel Co., Ltd., Swansea.

Sutton, H., C.B.E., D.Sc., F.R.Ae.S., F.I.M.; Director, Materials Research and Development (Air), Ministry of Supply.

Tinker, G. P., M.Sc., F.I.M.; Managing Director, Birlec Ltd.; Director, Birmingham Electric Furnaces, Ltd.; Director, Maiden and Co., Ltd.

Ex-officio : Chairmen of Local Sections**Birmingham**

Smith, S. S., M.Met., F.I.M.; Research Manager, Imperial Chemical Industries, Ltd., Metals Division, Birmingham.

London

Chaston, J. C., B.Sc., Ph.D., A.R.S.M., F.I.M.; Manager, Research Laboratories, Johnson, Matthey and Co., Ltd., Wembley, Middlesex.

Oxford

Murray, G., M.Sc., F.I.M.; Chief Metallurgist, Pressed Steel Co., Ltd., Cowley, Oxford.

Scottish

MacDonald, G., O.B.E., B.Sc., A.M.I.C.E., M.I.Mech.E.; Technical Manager and Director, E. Chalmers and Co., Ltd., Edinburgh.

Sheffield

Edwards, A., Ph.D., B.Sc., F.I.M.; Technical Manager, Magnet Department, James Neill and Co. (Sheffield), Ltd., Sheffield.

PERSONAL NOTES

South Wales

Walton, J. S., F.I.M., Metallurgist, Research and Development Division, High Duty Alloys, Ltd., Briton Ferry, Glam.

Representatives of Other Bodies :

The following, in accordance with Article 32, represent Government departments and allied societies at Council meetings, for purposes of liaison :

The Admiralty

Lane, Captain (E.) W. F. B., D.S.C., R.N.

The War Office

Lord, Major-General W. A., C.B., C.B.E., M.I.Mech.E., M.I.E.E.

The Institution of Metallurgists

Northcott, L., Ph.D., D.Sc., F.I.M.

West, E. G., Ph.D., B.Sc., F.I.M.

The Iron and Steel Institute

Bruce-Gardner, Sir Charles, Bt.

PERSONAL NOTES

DR. B. L. AVERBACH has been appointed Associate Professor of Metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.

MR. K. G. D. BAILEY has relinquished his post as Chief Metallurgist, Folland Aircraft, Ltd., Hamble, to join the Technical Sales Department of Magnesium Elektron, Ltd., Clifton Junction, near Manchester.

MR. PER BJÖRKMAN has left Hjorth and Co., Enköping, and taken up an appointment as metallurgist with AB Kanthal, Hallstahammar, Sweden.

DR. W. J. BRATINA is now a Research Fellow in solid-state physics at the Ontario Research Foundation, Toronto.

DR. J. E. BURKE has been appointed Manager of the newly created Ceramics Studies Section in the Metallurgy Department of the General Electric Research Laboratory, Schenectady, N.Y.

MR. CAMPBELL COE has been appointed Research Metallurgist to the Broken Hill Proprietary Co., Ltd., and has been seconded to work on the production of coke from brown coal, under Professor Worner at Melbourne University.

PROFESSOR A. H. COTTRELL has been elected a Fellow of the Royal Society.

MR. P. L. COWPER-COLES has been appointed Managing Director of Telektron (Great Britain), Ltd., London.

DR. T. B. CROW has joined the Research and Development Department of Foundry Services, Ltd., Birmingham. He was formerly with Emery Brothers, Ltd.

MR. D. T. ELLIS has been appointed Chief Metallurgist to The Moss Gear Co., Ltd., Birmingham.

MR. J. E. FAHLMAN has been appointed Executive Vice-President of the Permold Co., Medina, Ohio. He was previously General Manager.

MR. J. R. FREEMAN, Jr., has been appointed a Vice-President of the American Brass Company, Waterbury, Conn.

MR. R. C. GIFKINS has been awarded the Florence Taylor Medal for the best paper submitted in 1954 to the Melbourne Branch of the Australian Institute of Metals. His paper was entitled "Grains within Grains".

MR. O. J. HINETT has left Joseph Sankey and Sons, Ltd., Wellington, and taken an appointment with the Renold and Coventry Chain Co., Ltd., Coventry.

DR. R. W. K. HONEYCOMBE has been appointed Professor of Physical Metallurgy in the University of Sheffield. He had been Senior Lecturer in Physical Metallurgy since 1951.

MR. A. M. HORSFIELD has left the Quasi-Arc Co., Ltd., to become Technical Secretary with the British Welding Research Association.

MR. P. L. JACKSON has left the Ford Motor Company and is now Research Metallurgist with Misco Precision Casting Company, Whitehall, Mich.

DR. R. E. KEITH has left the Engineering Research Institute, University of Michigan, and is now at the Research Laboratories of the General Electric Company, Schenectady, N.Y.

DR. P. R. MARVIN has left the Commonwealth Engineering Company of Ohio, Dayton, O., to join the American Viscose Corp., Philadelphia 3, Pa.

MR. R. MAY has left the British Non-Ferrous Metals Research Association to join Yorkshire Copper Works, Ltd., Leeds. Mr. May formerly worked under the aegis of the Corrosion Research Committee of the Institute of Metals, being concerned with condenser-tube corrosion. When this research was taken over by the B.N.F.M.R.A. he joined the Association staff.

MR. D. R. MILLER has been appointed a Research Fellow in the Physical Metallurgy Section of the C.S.I.R.O., Baillieu Laboratory, Melbourne University.

MR. F. S. MITMAN has been appointed Deputy Chairman and Managing Director of Borg-Warner, Ltd.

MR. A. H. QUIGLEY has been appointed Chairman of the Board of the American Brass Company, Waterbury, Conn.

MR. J. G. RITCHIE has been awarded the Claude A. Stewart Medal of the Sydney Branch of the Australian Institute of Metals for a Paper on "Principles in the Heat-Treatment of High-Alloy Tool Steels".

MR. J. H. SCHLOEN has been appointed Manager of Canadian Copper Refineries, Ltd., East Montreal, P.Q., Canada.

MR. R. B. SMITH has been appointed Director, Engineering Standards and Data, Reynolds Metal Co., Louisville, Ky.

MR. J. E. SRAWLEY has been appointed Standards Engineer, Corporate Sales Division, Arwood Precision Casting Corp., Brooklyn, N.Y.

MR. A. TOMLINSON has been appointed Chief Metallurgist, Ford Motor Co., Ltd., Engineering Research Establishment, Birmingham 18.

MR. J. S. VANDERPLOEG has been appointed Vice-President and Managing Director of Anaconda American Brass, Ltd., New Toronto, Ont., Canada.

DR. M. A. WILLIAMSON has been elected Chairman of the Yale Metallurgical Alumni, an informal organization of persons who have attended the curricula in mining and metallurgy at the Hammond Laboratory, Yale University.

JOINT ACTIVITIES

Deaths

The Editor regrets to announce the deaths of:

MR. GEORGE WILLIAM BOOTH, Managing Director of Tysley Metal Works, Ltd., Birmingham, on 16 March.

MR. CHARLES WILLIAM ORR, who was killed in a motor accident on 3 October 1954. He was Officer-in-Charge, Defence Standards Laboratories, Alexandria, N.S.W., Australia and, at the time of his death, was President of the Sydney Branch of the Australian Institute of Metals.

OBITUARY

Mr. F. G. Connor

Mr. Francis George Connor died suddenly, on 28 February, of a heart attack while visiting Caracas in Venezuela, at the age of 55. He was a graduate of London University, and held the diploma in Electrical Engineering of the City and Guilds Engineering College and the diploma of the Imperial College of Science and Technology.

He joined the Electric Furnace Co., Ltd., in 1928. In 1945 he was appointed Managing Director of the newly formed Metallurgical Equipment Export Co., Ltd., an organization co-ordinating certain export activities of a number of the leading British makers of heavy metallurgical equipment. He was also a Director of Campbell, Gifford, and Morton, Ltd., Consulting Engineers. He travelled widely and was well known in metallurgical circles in the U.S.A. and in many South American and European countries. Recently he had been engaged in negotiating successfully large contracts for the export of metallurgical equipment for Government steelworks in Norway and Spain.

Mr. Connor was a strong supporter of educational and religious organizations in the Walton and Weybridge district of Surrey, where he lived. His death will be a great loss to his many friends and associates, who recognized his great ability in presenting the essence of complicated international transactions in straightforward language that could be easily assimilated by technical, financial, and Government officials. His linguistic attainments and remarkable memory were also of great value in negotiations with foreign nations.

JOINT ACTIVITIES

Sir George Beilby Memorial Awards, 1954

The Administrators of the Sir George Beilby Memorial Fund, representing the Institute of Metals, the Royal Institute of Chemistry, and the Society of Chemical Industry, have made awards from the Fund for 1954, each of one hundred and fifty guineas, to:

H. K. HARDY, M.Sc., Ph.D., A.R.S.M., in recognition of his work in physical metallurgy, with special reference to precipitation-hardening and to the thermodynamics of phase equilibria in alloy systems.

J. W. MENTER, M.A., Ph.D., A.Inst.P., in recognition of his work on surface phenomena, with special reference to the application of electron-optical techniques to the elucidation of a wide range of problems.

Awards from the Fund are made to British investigators in science as a mark of appreciation of distinguished work, particularly in such fields as fuel economy, chemical engineer-

ing, and metallurgy, in which Sir George Beilby's special interests lay. In general, the awards are not applicable to more senior investigators but are granted as an encouragement to relatively young men who have done independent work of exceptional merit over a period of years.

Dr. H. K. Hardy graduated with 1st Class Honours in Metallurgy at the Royal School of Mines in 1940. While at the Research Department of the Northern Aluminium Co., Ltd., and at Aluminium Laboratories, Ltd., he was concerned with the metallography of Duralumin-type alloys and the development of high-strength aluminium-zinc-magnesium alloys. Particular attention was paid to the nature of the extrusion process and to the microstructural effects associated with the onset of overheating. His interest in precipitation dates from this period. In 1946, Dr. Hardy joined the Fulmer Research Institute as Head of the Physical Metallurgy Section and was later appointed Senior Metallurgist. A full study was undertaken of the precipitation process in aluminium-copper alloys over a wide range of degrees of supersaturation. Considerable attention was given to the ways in which very small quantities of additional elements could significantly influence the mode of precipitation. An understanding of the phenomena was sought in thermodynamic principles, and work has also been carried out on the thermodynamics of phase equilibria in alloy systems. Other published work has been concerned with phase diagrams, the development of aluminium-tin alloys for bearings, the development of aluminium-copper-cadmium alloys, and the behaviour of industrial slags.

Dr. J. W. Menter was educated at Dover Grammar School and entered Peterhouse, Cambridge, as State Scholar and College Scholar in 1940. In 1942 he joined H.M. Anti-Submarine Experimental Establishment, where he assisted in the development of a number of Asdic devices. In 1945 he returned to Cambridge and, after completing the Natural Sciences Tripos in Physics, joined the Research Laboratory for the Physics and Chemistry of Surfaces, Department of Physical Chemistry, as a research student. He gained the Ph.D. degree in 1949 for a study by electron diffraction of the orientation of long-chain hydrocarbon compounds on metal surfaces. He then received a grant from the Warren Fund of the Royal Society, and later was awarded an I.C.I. Fellowship, which allowed him to pursue the application of electron-optical techniques to a wide range of problems. The subjects on which he has worked in collaboration with other scientists include the inhibition of the corrosion of iron by alkaline solutions, the quench-ageing of iron, and the effect of surface films on creep. More recently he has been investigating the fine structure of plastically deformed and heated metal foils.

He has recently joined the Tube Investments Research Laboratories, Hinxton Hall, as a research scientist, where he leads a group working on surface phenomena.

NEWS OF KINDRED SOCIETIES

The Iron and Steel Institute

Award of Medals and Prizes

The following awards were made at a meeting of the Council held on 1 March 1955:

Bessemer Gold Medal for 1955:

To Professor JOHN CHIPMAN, Head of the Department of Metallurgy, Massachusetts Institute of Technology, in recogni-

tion of his distinguished contributions to the knowledge of the physical chemistry of steelmaking.

Sir Robert Hadfield Medal for 1955:

To Mr. TOR FJALAR HOLMBERG, of Oy Vuoksenniska A.B., in appreciation of his meritorious service in improving the technique of the production of iron and steel at the Imatra Works, Finland.

Andrew Carnegie Silver Medal for 1954:

To Mr. B. CINA, Brown-Firth Research Laboratories, in respect of research at Sheffield University and his paper on: "The Effect of Cold Work on the Gamma-Alpha Transformation in Some Fe-Ni-Cr Alloys" (*J. Iron Steel Inst.*, 1954, **177**, (4), 406).

Williams Prizes for 1954 (Value £100 each):

To Mr. W. JACKSON, Melting Shop Manager, Appleby-Frodingham Steel Co., in respect of his paper on "Use of Coke-Oven Gas and Pitch-Creosote Firing on Tilting Furnaces" (*J. Iron Steel Inst.*, 1954, **178**, (4), 378).

To Mr. R. McDONALD, Colvilles Ltd., in respect of his paper on "Steelworks Waste-Heat Boiler Practice" (*J. Iron Steel Inst.*, 1954, **176**, (1), 71).

To Mr. A. STIRLING, Stewarts and Lloyds, Ltd., in respect of his paper on "The Pelletizing of Northampton Sand Ironstones by Vacuum Extrusion" (*J. Iron Steel Inst.*, 1954, **177**, (1), 25).

Ablett Prize for 1954:

No award was made.

OTHER NEWS

Symposium on the Extraction Metallurgy of Some of the Less-Common Metals

The Institution of Mining and Metallurgy announce that it has been necessary to postpone the Symposium on the Extraction Metallurgy of some of the Less-Common Metals which was to have been held in September 1955. This will now be held in London on Thursday and Friday, 22 and 23 March 1956. Further particulars will be published later.

Aluminium in Shipbuilding

A Joint Symposium on the Use and Welding of Aluminium in Shipbuilding is to be held at the Institution of Naval Architects on 7 and 8 December 1955.

An Organizing Committee has been established, representing the Institute of Welding, the Institution of Naval Architects, the British Shipbuilding Research Association, the British Welding Research Association, and the Aluminium Development Association.

The Secretary of the Symposium is Mr. G. Parsloe, the Secretary of the Institute of Welding, 2 Buckingham Palace Gardens, London, S.W.1.

International Congress on Documentation of Applied Chemistry

The First International Congress on Documentation of Applied Chemistry will be held at the Institut Français du Royaume Uni, London, S.W.7, from 23 to 25 November 1955. The registration of members attending will take place on the evening of Tuesday, 22 November.

The Congress, held under the patronage of the International Union of Pure and Applied Chemistry, is sponsored by the

Society of Chemical Industry and has as President of Honour The Rt. Hon. Lord Cherwell, C.H., F.R.S. Membership of the Congress is open to all interested persons on payment of the membership fee of £2 2s. All enquiries should be addressed to: The Honorary Secretary, International Congress on Documentation of Applied Chemistry, 56 Victoria Street, London, S.W.1.

Students' Visit to Germany

Visits to works in the Ruhr area were made by a party of undergraduate and postgraduate students of metallurgy at the Battersea Polytechnic during the Easter vacation.

APPOINTMENTS VACANT

ALUMINIUM POWDER PLANT (atomized, blown, granular) which is to be designed, erected, and run by a leading firm in the metal-powder field requires Engineer-Metallurgist with the necessary experience. Apply, stating previous experience and salary required, to Box No. 388, The Institute of Metals, 4 Grosvenor Gardens, London, S.W.1.

ASSISTANT METALLURGIST or chemist is required for research work on high-temperature materials, hard metals, and cutting-tool materials. Applicants should preferably have had previous experience of laboratory work and should possess a metallurgical or chemical degree, a Higher National certificate, or equivalent qualification. Apply, quoting reference HM, and stating age, qualifications, and experience, to Director of Research, The British Thomson-Houston Co., Ltd., Rugby.

HADFIELDS, LTD. Vacancies exist in the Research Department for:

- (a) a young Metallurgical Graduate, and
- (b) a young man, having completed National Service, and studying for a qualification in Metallurgy.

The positions are concerned with Works Investigations connected with the quality of carbon and alloy steels. Some experience of steel-works processes desirable, but not essential. Good working conditions, five-day week, staff dining and welfare facilities available. Applications, with details of qualifications and experience to date, and stating age and salary required, should be addressed to the Personnel Manager, Hadfields, Ltd., East Hecla Works, Vulcan Road, Sheffield 9.

IMPERIAL SMELTING CORPORATION require Patents Officer for duties on patent specifications in development work. Applicants should have a knowledge of statistics and preferably possess a degree in chemistry, metallurgy, or chemical engineering. Experience of abstracting and French/German translation would be advantageous. Applications, with full details, to Personnel Manager, Imperial Smelting Corporation, Limited, St. Andrew's Road, Avonmouth, Nr. Bristol, quoting reference PAT/IM.

LITHIUM AND LITHIUM SALTS. Experienced Metallurgical-Engineer required for planning of production plant and running same. Apply, stating previous experience and salary required, to Box No. 389, The Institute of Metals, 4 Grosvenor Gardens, London, S.W.1.

METALLURGIST required to carry out investigations of problems associated with important new industrial process. In addition to metallurgical qualifications, a sound knowledge of general physics and chemistry and ability to work on own initiative essential. Location central London. Pension scheme available. Box No. 390, Institute of Metals, 4 Grosvenor Gardens, London, S.W.1.

METALLURGIST. The Nuffield Central Research Laboratories, Courthouse Green, Coventry, require a male metallurgist. A graduate or L.I.M. with 2-3 years' laboratory experience, preferably with a knowledge of spectrographic and X-ray-diffraction work. Write, stating age, experience, qualifications, and salary expected, to Chief Chemist and Metallurgist, at the above address.

METALLURGISTS having a good Honours degree, and preferably with research experience, are required for research on materials for use at high temperatures and also on hard metals and cutting-tool materials. Apply, quoting reference HM, and stating age, qualifications, and experience, to Director of Research, The British Thomson-Houston Co., Ltd., Rugby.

APPOINTMENTS VACANT

RESEARCH METALLOGRAPHER required as member of Research Team on the weldability of aluminium alloys, to lead small group engaged on mechanical testing and metallographic examination. **SENIOR RESEARCH ASSISTANTS** required to join research teams on the welding of steels by the gas-shielded metal-arc process and the weldability of low- and high-alloy steels. Experience in testing and metallographical procedure with specific reference to steel is desirable. Salary range for both positions £500-£800, according to age and experience. Apply the Secretary, B.W.R.A., 29 Park Crescent, London, W.1.

THE RESEARCH LABORATORY of the British Thomson-Houston Co., Ltd., requires a graduate in metallurgy or physics to join an expanding group working on the strength of metals, with particular reference to high-temperature properties. Apply, quoting reference HJ and stating age, qualifications, and experience to the Director of Research, The British Thomson-Houston Co., Ltd., Rugby.

UNITED KINGDOM ATOMIC ENERGY AUTHORITY, A.E.R.E., Harwell, Berks., invites applications from an **HONOURS GRADUATE** to work on the application of novel and unconventional techniques to fundamental research on the fabrication of an unusual metal. For this post evidence of research ability is necessary, and experience of small-scale metal fabrication is desirable. The successful candidate will be appointed either in the grade of Senior Scientific Officer (£1040-£1205 per annum) or Scientific Officer (£505-£905 per annum), according to age, experience, and qualifications, and he will be required to join the Authority's contributory superannuation scheme. A house will be available within a reasonable period if he is married and lives outside the radius of the Establishment's transport facilities; and an advance will be given towards the cost of removal where necessary. Applications should be sent to Establishment Officer, A.E.R.E., Harwell, Didcot, Berks., quoting 2/103/259.

UNITED KINGDOM ATOMIC ENERGY AUTHORITY, A.E.R.E., Harwell, Berks., invites applications for the post of **EXPERIMENTAL OFFICER** to do fundamental research and development work on the metallurgy of Plutonium. This work involves novel and unconventional techniques in order to understand the behaviour of an unusual metal. There are now some opportunities for the publication of experimental results in this unexplored field of metallurgy. Applicants should be at least 26 years of age and possess minimum qualifications of Higher School Certificate in science subjects or General Certificate of Education "Advanced" in two science subjects, or equivalent qualifications. Preference will be given, however, to a candidate with higher qualifications in metallurgy, physics, or chemistry. Evidence of research experience or experimental aptitude is important. The successful candidate will be appointed within the salary scale £775-£945 per annum, according to age, experience, and qualifications, and he will be required to join the Authority's contributory superannuation scheme. A house will be available within a reasonable period if he is married and lives outside the radius of the Establishment's transport facilities; and an advance will be given towards the cost of removal where necessary. Applications to Establishment Officer, United Kingdom Atomic Energy Authority, A.E.R.E. Harwell, Didcot, Berks., quoting 2/103/260.

UNITED KINGDOM ATOMIC ENERGY AUTHORITY, A.E.R.E., Harwell, Berks., invites applications for the following posts in its Metallurgy Division:

Post A: To work in a team engaged on the development of fabrication techniques for the fuel elements to be used in Nuclear Reactors. Little work has been done in this field of metallurgy, and there will be unlimited scope for the man with unusual ideas. Applicants should have had experience in H.F. melting and casting, rolling, extrusion, and powder-metallurgy processes, together with knowledge of vacuum techniques. They should have ability to design and assemble fabrication equipment as well as to carry out experiments up to prototype scale. Quote 2/103/254.

Post B: To work with a group investigating the effects of irradiation on the physical properties of materials, and to assist in the design, development, and use of new techniques for measuring the mechanical properties of metals. Experience of electrical and mechanical design of equipment, together with a practical experience and knowledge of vacuum technology, are desirable. Quote 2/103/255.

Post C: Research Metallographer is required to work on problems arising from research on fissile metals and nuclear processes. As the work involves relatively new and undeveloped metals, there will be ample opportunity to develop own ideas and techniques, with scope

for publication of results. Laboratories are equipped for remote handling and television techniques. Quote 2/103/256.

Post D: To carry out interesting and non-routine analytical work on the rare materials and alloys required in the development of atomic energy. The appointment offers scope for original work. Experience in modern techniques is desirable. Quote 2/103/257.

Post E: To investigate the fabrication problems of unusual metals, cermets, and ceramics to be used as fuel elements in nuclear reactors of many types. This is a field of metallurgy in which comparatively little work has been done and workers in this field have opportunity to solve some unusual problems. Quote 2/103/258.

Post F: To work on problems associated with the effects of pile irradiation on nuclear fuels of various types. These investigations are vital to the development of atomic power and involve pioneering new methods in the metallurgical field. There is plenty of scope for a person with an experimental flair and imaginative ideas. Applicants should have had experience in metallurgy or physics with a bent towards engineering. Quote 2/103/261.

Applicants should possess minimum qualifications of Higher School Certificate in science subjects or General Certificate of Education "Advanced" in two science subjects, or equivalent qualifications. Preference will be given, however, to candidates with higher qualifications in metallurgy, physics, or chemistry. The appointments will either be in the grade of Experimental Officer (£775-£945 per annum) or Assistant Experimental Officer (£310 (at age 18)-£685 per annum), according to age, experience, and qualifications, and the successful candidates will be required to join the Authority's contributory superannuation scheme. Houses will be available within a reasonable period for the selected officers if they are married and live outside the radius of the Establishment's transport facilities; and advances will be given towards the cost of removal where necessary. Applications should be sent to Establishment Officer, United Kingdom Atomic Energy Authority, A.E.R.E., Harwell, Didcot, Berks., quoting the appropriate reference.

THE UNIVERSITY OF BIRMINGHAM

DEPARTMENT OF INDUSTRIAL METALLURGY

Applications are invited for the post of Research Assistant to the Joseph Lucas Research Fellow in Electrometallurgy at a salary within the range £350-£550.

Applicants must possess an Honours Degree in Metallurgy, Physics, or Chemistry. The successful candidate will be required to undertake research on the growth, structure, and properties of electrodeposits and will have the opportunity of submitting a thesis for a higher degree.

Applications should reach the Registrar, The University, Edgbaston, Birmingham 15, as soon as possible.

G. L. BARNES,
Secretary.

The University,
Birmingham 15.

THE UNIVERSITY OF MANCHESTER

Applications are invited for the post of **LECTURER IN METALLURGY** from graduates in Metallurgy or Chemistry, with special qualifications in spectroscopic and other modern analytical techniques. Experience in metallography would be an advantage. The successful applicant will be responsible for organizing a laboratory for advanced Metallurgical Analysis. Salary on a scale £650 × £50-£1350 per annum; initial salary according to qualifications and experience. Membership of F.S.S.U. and Children's Allowance Scheme. Applications should be sent not later than 31 May 1955, to the Registrar, The University, Manchester 13, from whom forms of application and further particulars may be obtained.

THE UNIVERSITY OF MANCHESTER

Applications are invited from Metallographers, male or female, for the post of **RESEARCH ASSISTANT** in the Department of Metallurgy. Candidates should possess experience in practical microscopy. Salary £550 per annum, and membership of Children's Allowance Scheme. Applications should be sent not later than 31 May 1955, to the Registrar, The University, Manchester 13, from whom forms of application and further particulars may be obtained.

METALLURGICAL TRANSLATIONS from French, German, and Italian undertaken by translator with considerable non-ferrous experience. 30/- per 1000 words. References supplied. Mrs. L. F. Secretan, M.A., 8 Cambridge Rd., Wimbledon, London, S.W.20.